



## SEQUENCE LISTING

<110> Moyle, William R.  
Xing, Yongna

<120> Protein Knobs

<130> 268/279-RWJ-01-40

<140> 60/345,283  
<141> 2001-11-08

<160> 56

<170> PatentIn version 3.1

<210> 1  
<211> 92  
<212> PRT  
<213> Homo sapiens

<400> 1

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1 . . 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65 70 75

80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 2  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Gln5

<400> 2

Ala Pro Asp Val Cys Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65 70 75

80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 3

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Leu12

<400> 3

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Cys Gln Glu Asn  
Pro

1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 4  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Asn15

<400> 4

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Cys  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 5  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Phe17

<400> 5

Ala	Pro	Asp	Val	Gln	Asp	Cys	Pro	Glu	Cys	Thr	Leu	Gln	Glu	Asn
Pro														
1														15
Cys	Phe	Ser	Gln	Pro	Gly	Ala	Pro	Ile	Leu	Gln	Cys	Met	Gly	Cys
Cys														
	20							25						30
Phe	Ser	Arg	Ala	Tyr	Pro	Thr	Pro	Leu	Arg	Ser	Lys	Lys	Thr	Met
Leu														
	35					40								45
Val	Gln	Lys	Asn	Val	Thr	Ser	Glu	Ser	Thr	Cys	Cys	Val	Ala	Lys
Ser														
	50				55									60
Tyr	Asn	Arg	Val	Thr	Val	Met	Gly	Gly	Phe	Lys	Val	Glu	Asn	His
Thr														
	65				70									75
	80													
Ala	Cys	His	Cys	Ser	Thr	Cys	Tyr	Tyr	His	Lys	Ser			
	85								90					

<210> 6  
<211> 92  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> hCG alpha-subunit with Cys substituted for Leu22  
  
<400> 6

65	70	75
80		
Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser		
	85	90
<210> 7		
<211> 92		
<212> PRT		
<213> Artificial Sequence		
<220>		
<223> hCG alpha-subunit with Cys substituted for Gln7		
<400> 7		
Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn		
Pro		
1	5	10
		15
Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Cys Cys Met Gly Cys		
Cys		
20	25	30
Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met		
Leu		
35	40	45
Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys		
Ser		
50	55	60
Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His		
Thr		
65	70	75
80		
Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser		
	85	90
<210> 8		
<211> 92		
<212> PRT		
<213> Artificial Sequence		
<220>		
<223> hCG alpha-subunit with Cys substituted for Leu22		
<400> 8		
Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Cys Gln Glu Asn		
Pro		

1	5	10	15											
Phe	Phe	Ser	Gln	Pro	Gly	Ala	Pro	Ile	Leu	Gln	Cys	Met	Gly	Cys
Cys														
	20						25						30	
Phe	Ser	Arg	Ala	Tyr	Pro	Thr	Pro	Leu	Arg	Ser	Lys	Lys	Thr	Met
Leu														
	35					40							45	
Val	Gln	Lys	Asn	Val	Thr	Ser	Glu	Ser	Thr	Cys	Cys	Val	Ala	Lys
Ser														
	50				55							60		
Tyr	Asn	Arg	Val	Thr	Val	Met	Gly	Gly	Phe	Lys	Val	Glu	Asn	His
Thr														
65				70						75				
80														
Ala	Cys	His	Cys	Ser	Thr	Cys	Tyr	Tyr	His	Lys	Ser			
	85							90						

<210> 9  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Arg35  
<400> 9

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe	Phe	Ser	Gln	Pro	Gly	Ala	Pro	Ile	Leu	Gln	Cys	Met	Gly	Cys
Cys														
	20						25							30

Phe Ser Cys Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu 35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 10  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Tyr37

<400> 10

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Cys Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 11  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Pro38

<400> 11

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

Phe Ser Arg Ala Tyr Cys Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu 35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser 59 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
 85 90

<210> 12

<211> 92

<211> 52

<212> TRI  
<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Thr39

<400> 12

Ala Pro A

Phe	Phe	Ser	Gln	Pro	Gly	Ala	Pro	Ile	Leu	Gln	Cys	Met	Gly
Cys													
	20							25					30

Phe Ser Arg Ala Tyr Pro Cys Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 13  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Pro40

<400> 13

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Cys Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 14  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Leu41

<400> 14

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
 Cys 20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Cys Arg Ser Lys Lys Thr Met  
Leu 35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
 Ser 50 55 60

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 15  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Arg42

<400> 15

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Cys Ser Lys Lys Thr Met  
Leu

35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 16

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Ser43

<400> 16

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Cys Lys Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 17  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Lys44  
<400> 17

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Cys Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 18  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Lys45  
<400> 18

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Cys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 19  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha subunit with Cys substituted for Thr46

<400> 19

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Cys Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 20

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Met47

<400> 20

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Cys  
Leu

35

40

45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50

55

60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65

70

75

80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 21

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Leu48

<400> 21

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1

5

10

15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20

25

30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Cys

35

40

45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50

55

60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65

70

75

80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 22

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Val49

<400> 22

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Cys Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 23

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Gln50

<400> 23

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Cys Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 24  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Lys51  
<400> 24

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Cys Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser Ala Pro Asp  
Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Gln Cys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 25  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Asn52

<400> 25

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35 40 45

Val Gln Lys Cys Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 26

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Val153

<400> 26

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35 40 45

Val Gln Lys Asn Cys Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 27  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Glu56  
<400> 27

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Cys Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 28

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Ser64

<400> 28

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1

5

10

15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20

25

30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35

40

45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Cys  
Ser

50

55

60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65

70

75

80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 29

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Val176

<400> 29

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1

5

10

15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Cys Glu Asn His  
Thr

65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 30

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Thr86

<400> 30

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50

55

60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Cys Cys Tyr Tyr His Lys Ser  
85 90

<210> 31  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit with Cys substituted for Tyr88

<400> 31

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Cys Tyr His Lys Ser  
85 90

<210> 32

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Leu89

<400> 32

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65 70 75

80

Ala Cys His Cys Ser Thr Cys Tyr Cys His Lys Ser  
85 90

<210> 33

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for His90

<400> 33

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr Cys Lys Ser  
85 90

<210> 34

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit with Cys substituted for Lys91

<400> 34

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Cys Ser  
85 90

<210> 35  
<211> 92  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> hCG alpha-subunit with Cys substituted for Ser92  
  
<400> 35

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Cys  
85 90

<210> 36  
<211> 145  
<212> PRT

<213> Homo sapiens

<400> 36

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu

1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr

20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val

35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe

50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val  
Val

65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg  
Ser

85 90 95

Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp  
Asp

100 105 110

Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser  
Leu

115 120 125

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu  
Pro Gln

130 135 140

<210> 37

<211> 145

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG beta-subunit with Cys substituted for Ser138

<400> 37

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu  
1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr  
20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val  
35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe  
50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val  
Val  
65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg  
Ser  
85 90 95

Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp  
Asp  
100 105 110

Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser  
Leu  
115 120 125

Pro Ser Pro Ser Arg Leu Pro Gly Pro Cys Asp Thr Pro Ile Leu  
Pro Gln  
130 135 140

<210> 38

<211> 145

<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG beta-subunit residues 101-114 were replaced with  
their hFSH b  
eta-subunit counterparts, namely hFSH beta-subunit  
residues 95-10  
8

<400> 38

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu  
1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr  
20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val  
35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe  
50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val  
Val  
65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg  
Ser  
85 90 95

Thr Thr Asp Cys Thr Val Arg Gly Leu Gly Pro Ser Tyr Cys Ser  
Phe  
100 105 110

Gly Glu Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser  
Leu  
115 120 125

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu  
Pro Gln  
130 135 140

<210> 39  
<211> 145  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG beta-subunit residues 101-114 were replaced with  
their hFSH b  
eta-subunit counterparts, namely hFSH beta-subunit  
residues 95-10  
8, and Serine38 in the beta-subunit carboxyterminus  
of this  
analog was replaced with Cys

<400> 39

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu  
1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr  
20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val  
35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe  
50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val  
Val  
65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg  
Ser  
85 90 95

Thr Thr Asp Cys Thr Val Arg Gly Leu Gly Pro Ser Tyr Cys Ser  
Phe

	100	105	110
Gly Glu Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser			
Leu			
	115	120	125
Pro Ser Pro Ser Arg Leu Pro Gly Pro Cys Asp Thr Pro Ile Leu			
Pro Gln			
	130	135	140
<210> 40			
<211> 111			
<212> PRT			
<213> Homo sapiens			
<400> 40			
Asn Ser Cys Glu Leu Thr Asn Ile Thr Ile Ala Val Glu Lys Glu			
Gly			
1	5	10	15
Cys Gly Phe Cys Ile Thr Ile Asn Thr Thr Trp Cys Ala Gly Tyr			
Cys			
	20	25	30
Tyr Thr Arg Asp Leu Val Tyr Lys Asp Pro Ala Arg Pro Lys Ile			
Gln			
	35	40	45
Lys Thr Cys Thr Phe Lys Glu Leu Val Tyr Glu Thr Val Arg Val			
Pro			
	50	55	60
Gly Cys Ala His His Ala Asp Ser Leu Tyr Thr Tyr Pro Val Ala			
Thr			
	65	70	75
80			
Gln Cys His Cys Gly Lys Cys Asp Ser Asp Ser Thr Asp Cys Thr			
Val			
	85	90	95
Arg Gly Leu Gly Pro Ser Tyr Cys Ser Phe Gly Glu Met Lys Glu			
	100	105	110

<210> 41  
 <211> 139  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> hFSH beta-subunit analog lacking the leader peptide  
 of hFSH beta-  
 subunit with hFSH residues 1-108 and hCG residues  
 115-145 in  
 tandem

<400> 41

Asn	Ser	Cys	Glu	Leu	Thr	Asn	Ile	Thr	Ile	Ala	Val	Glu	Lys	Glu
Gly														
1				5					10				15	

  

Cys	Gly	Phe	Cys	Ile	Thr	Ile	Asn	Thr	Thr	Trp	Cys	Ala	Gly	Tyr
Cys														
		20					25						30	

  

Tyr	Thr	Arg	Asp	Leu	Val	Tyr	Lys	Asp	Pro	Ala	Arg	Pro	Lys	Ile
Gln														
		35				40					45			

  

Lys	Thr	Cys	Thr	Phe	Lys	Glu	Leu	Val	Tyr	Glu	Thr	Val	Arg	Val
Pro														
		50			55				60					

  

Gly	Cys	Ala	His	His	Ala	Asp	Ser	Leu	Tyr	Thr	Tyr	Pro	Val	Ala
Thr														
65					70				75					
80														

  

Gln	Cys	His	Cys	Gly	Lys	Cys	Asp	Ser	Asp	Ser	Thr	Asp	Cys	Thr
Val														
		85				90					95			

  

Arg	Gly	Leu	Gly	Pro	Ser	Tyr	Cys	Ser	Phe	Gly	Glu	Phe	Gln	Asp
Ser														
		100			105				110					

  

Ser	Ser	Ser	Lys	Ala	Pro	Pro	Pro	Ser	Leu	Pro	Ser	Pro	Ser	Arg
Leu														
		115			120				125					

Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln  
130 135

<210> 42  
<211> 137  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hFSH beta-subunit analog lacking the leader peptide  
of hFSH beta-  
subunit with hFSH residues 1-108 and hCG residues  
115-145 in tandem  
and with Ser132 replaced with Cys

<400> 42

Asn Ser Cys Glu Leu Thr Asn Ile Thr Ile Ala Val Glu Lys Glu  
Gly  
1 5 10 15

Cys Gly Phe Cys Ile Thr Ile Asn Thr Thr Trp Cys Ala Gly Tyr  
Cys  
20 25 30

Tyr Thr Arg Asp Leu Val Tyr Lys Asp Pro Ala Arg Pro Lys Ile  
Gln  
35 40 45

Lys Thr Cys Thr Phe Lys Glu Leu Val Tyr Glu Thr Val Arg Val  
Pro  
50 55 60

Gly Cys Ala His His Ala Asp Ser Leu Tyr Thr Tyr Pro Val Ala  
Thr  
65 70 75  
80

Gln Cys His Cys Gly Lys Cys Asp Ser Asp Ser Thr Asp Cys Thr  
Val  
85 90 95

Arg Gly Leu Gly Pro Ser Tyr Cys Ser Phe Gly Glu Phe Gln Asp  
Ser  
100 105 110

Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg  
Leu  
115 120 125

Pro Gly Pro Cys Asp Thr Pro Ile Leu  
130 135

<210> 43  
<211> 401  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCGbeta, S138C-betaLA(short), beta-lactamase fused to  
a truncated  
version of hCGbeta, S138C

<400> 43

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu  
1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr  
20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val  
35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe  
50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val  
Val  
65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg  
Ser  
85 90 95

Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp  
Asp  
100 105 110

Pro Arg Phe Gln Asp Ser Ser Ser Lys Ala Pro Pro Pro Ser  
Leu  
115 120 125

Pro Ser Pro Ser Arg Leu Pro Gly Pro Cys Asp His Pro Glu Thr  
Leu  
130 135 140

Val Lys Val Lys Asp Ala Glu Asp Gln Leu Gly Ala Arg Val Gly  
Tyr  
145 150 155  
160

Ile Glu Leu Asp Leu Asn Ser Gly Lys Ile Leu Glu Ser Phe Arg  
Pro  
165 170 175

Glu Glu Arg Phe Pro Met Met Ser Thr Phe Lys Val Leu Leu Cys  
Gly  
180 185 190

Ala Val Leu Ser Arg Ile Asp Ala Gly Gln Glu Gln Leu Gly Arg  
Arg  
195 200 205

Ile His Tyr Ser Gln Asn Asp Leu Val Glu Tyr Ser Pro Val Thr  
Glu  
210 215 220

Lys His Leu Thr Asp Gly Met Thr Val Arg Glu Leu Cys Ser Ala  
Ala  
225 230 235  
240

Ile Thr Met Ser Asp Asn Thr Ala Ala Asn Leu Leu Leu Thr Thr  
Ile  
245 250 255

Gly Gly Pro Lys Glu Leu Thr Ala Phe Leu His Asn Met Gly Asp  
His

	260	265	270
Val Thr Arg Leu Asp Arg Trp Glu Pro Glu Leu Asn Glu Ala Ile			
Pro			
	275	280	285
Asn Glu Arg Asp Thr Thr Met Pro Val Ala Met Ala Thr Thr Leu			
Arg			
	290	295	300
Lys Leu Leu Thr Gly Glu Leu Leu Thr Leu Ala Ser Arg Gln Gln			
Leu			
	305	310	315
320			
Ile Asp Trp Met Glu Ala Asp Lys Val Ala Gly Pro Leu Leu Arg			
Ser			
	325	330	335
Ala Leu Pro Ala Gly Trp Phe Ile Ala Asp Lys Ser Gly Ala Gly			
Glu			
	340	345	350
Arg Gly Ser Arg Gly Ile Ile Ala Ala Leu Gly Pro Asp Gly Lys			
Pro			
	355	360	365
Ser Arg Ile Val Val Ile Tyr Thr Thr Gly Ser Gln Ala Thr Met			
Asp			
	370	375	380
Glu Arg Asn Arg Gln Ile Ala Glu Ile Gly Ala Ser Leu Ile Lys			
His			
	385	390	395
400			
Trp			

<210> 44  
<211> 408  
<212> PRT  
<213> Artificial Sequence  
  
<220>

<223> hCGbeta, S138C-betaLA(long), beta-lactamase fused to  
the carboxyte  
rminal end of hCGb, S138C

<400> 44

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu  
1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr  
20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val  
35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe  
50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val  
Val  
65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg  
Ser  
85 90 95

Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp  
Asp  
100 105 110

Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser  
Leu  
115 120 125

Pro Ser Pro Ser Arg Leu Pro Gly Pro Cys Asp Thr Pro Ile Leu  
Pro  
130 135 140

Gln His Pro Glu Thr Leu Val Lys Val Lys Asp Ala Glu Asp Gln  
Leu

145	150	155
160		
Gly Ala Arg Val Gly Tyr Ile Glu Leu Asp Leu Asn Ser Gly Lys		
Ile		
	165	170
		175
Leu Glu Ser Phe Arg Pro Glu Glu Arg Phe Pro Met Met Ser Thr		
Phe		
	180	185
		190
Lys Val Leu Leu Cys Gly Ala Val Leu Ser Arg Ile Asp Ala Gly		
Gln		
	195	200
		205
Glu Gln Leu Gly Arg Arg Ile His Tyr Ser Gln Asn Asp Leu Val		
Glu		
	210	215
		220
Tyr Ser Pro Val Thr Glu Lys His Leu Thr Asp Gly Met Thr Val		
Arg		
	225	230
		235
	240	
Glu Leu Cys Ser Ala Ala Ile Thr Met Ser Asp Asn Thr Ala Ala		
Asn		
	245	250
		255
Leu Leu Leu Thr Thr Ile Gly Gly Pro Lys Glu Leu Thr Ala Phe		
Leu		
	260	265
		270
His Asn Met Gly Asp His Val Thr Arg Leu Asp Arg Trp Glu Pro		
Glu		
	275	280
		285
Leu Asn Glu Ala Ile Pro Asn Asp Glu Arg Asp Thr Thr Met Pro		
Val		
	290	295
		300
Ala Met Ala Thr Thr Leu Arg Lys Leu Leu Thr Gly Glu Leu Leu		
Thr		
	305	310
		315
	320	

Leu Ala Ser Arg Gln Gln Leu Ile Asp Trp Met Glu Ala Asp Lys  
Val 325 330 335

Ala Gly Pro Leu Leu Arg Ser Ala Leu Pro Ala Gly Trp Phe Ile  
Ala 340 345 350

Asp Lys Ser Gly Ala Gly Glu Arg Gly Ser Arg Gly Ile Ile Ala  
Ala 355 360 365

Leu Gly Pro Asp Gly Lys Pro Ser Arg Ile Val Val Ile Tyr Thr  
Thr 370 375 380

Gly Ser Gln Ala Thr Met Asp Glu Arg Asn Arg Gln Ile Ala Glu  
Ile 385 390 395  
400

Gly Ala Ser Leu Ile Lys His Trp  
405

<210> 45  
<211> 125  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCGbeta,delta116-135,S138C

<400> 45

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu 1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr 20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val

35	40	45
Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg		
Phe		
50	55	60
Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val		
Val		
65	70	75
80		
Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg		
Ser		
85	90	95
Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp		
Asp		
100	105	110
Pro Arg Phe Gly Pro Cys Asp Thr Pro Ile Leu Pro Gln		
115	120	
<210> 46		
<211> 130		
<212> PRT		
<213> Artificial Sequence		
<220>		
<223> hCGbeta, delta121-135, S138C		
<400> 46		
Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr		
Leu		
1	5	10
15		
Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr		
Thr		
20	25	30
Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly		
Val		
35	40	45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe  
50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val  
Val  
65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg  
Ser  
85 90 95

Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp  
Asp  
100 105 110

Pro Arg Phe Gln Asp Ser Ser Ser Gly Pro Cys Asp Thr Pro Ile  
Leu  
115 120 125

Pro Gln

<210> 47  
<211> 136  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCGbeta,delta126-135,S138C

<400> 47

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu  
1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr  
20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val  
35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe  
50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val  
Val  
65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg  
Ser  
85 90 95

Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp  
Asp  
100 105 110

Pro Arg Phe Gln Asp Ser Ser Ser Lys Ala Pro Pro Pro Gly  
Pro  
115 120 125

Cys Asp Thr Pro Ile Leu Pro Gln  
130 135

<210> 48  
<211> 140  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCGbeta,delta131-135,S138C

<400> 48

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu  
1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr  
20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val  
35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe  
50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Asn Pro Val  
Val  
65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg  
Ser  
85 90 95

Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp  
Asp  
100 105 110

Pro Arg Phe Gln Asp Ser Ser Ser Lys Ala Pro Pro Pro Ser  
Leu  
115 120 125

Pro Ser Gly Pro Cys Asp Thr Pro Ile Leu Pro Gln  
130 135

<210> 49  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit, Lys91 replaced with Glu

<400> 49

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35

40

45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50

55

60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65

70

75

80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Glu Ser  
85 90

<210> 50

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit loop 2, Lys91 replaced with Met

<400> 50

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1

5

10

15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20

25

30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

.

35

40

45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50

55

60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65

70

75

80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Met Ser  
85 90

<210> 51  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit loop 2, Lys44 replaced with Ala  
<400> 51

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Ala Lys Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 52  
<211> 92  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG alpha-subunit loop 2, Lys44 replaced with Glu and  
Lys45 repla  
ced with Gln

<400> 52

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Glu Gln Thr Met  
Leu  
35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser  
50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr  
65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 53

<211> 92

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG alpha-subunit loop 2, Lys44 replaced with Arg

<400> 53

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro  
1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys  
20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Arg Lys Thr Met  
Leu

35

40

45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50

55

60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65

70

75

80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
85 90

<210> 54

<211> 139

<212> PRT

<213> Artificial Sequence

<220>

<223> hCG analog - beta101-145, alpha, residues 3-100  
deleted from hCG

beta-subunit with alpha-subunit fused to the end of  
the remaining  
beta-subunit

<400> 54

Ser Lys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp Asp Pro  
Arg

1

5

10

15

Phe Gln Asp Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro  
Ser

20

25

30

Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln  
Ala

35

40

45

Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn Pro  
Phe

50

55

60

Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys Cys  
Phe

65  
80

70

75

Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met Leu  
Val

85

90

95

Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys Ser  
Tyr

100

105

110

Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His Thr  
Ala

115

120

125

Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser  
130 135

<210> 55

<211> 31

<212> PRT

<213> Homo sapiens

<400> 55

Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro  
Ser

1

5

10

15

Pro Ser Arg Leu Pro Gly Pro Ser Thr Asp Pro Ile Leu Pro Gly  
20 25 30

<210> 56

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> X<sub>l</sub>-Asp-Asp-Asp-Asp-Lys-Ser-Y<sub>m</sub>-Cys-Z<sub>n</sub>, where X, Y, and Z refer to  
any tail portion amino acids and l, m, and n refer to  
the lengths  
of the tail portion amino acids

<220>

<221> MISC\_FEATURE

<223> Xaa refers to any tail portion amino acids and n  
refers to the  
lengths of the tail portion amino acids

<400> 56

Xaan Asp Asp Asp Asp Lys Ser Xaan Cys Xaan  
1 5 10

<210> 57

<211> 92

<212> PRT

<213> Artifical Sequence

<220>

<223> An hCG truncated (-subunit analog fused to the hCG  
alpha-carboxyterminus

<400> 57

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1 5 10 15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20 25 30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35 40 45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50 55 60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65 70 75  
80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser Asp Asp Pro  
Arg

85 90 95

Phe Gly Pro Cys Asp Thr Pro Ile Leu Pro Gln  
100 105

<210> 58

<211> 145

<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG beta-subunit with Cys substituted for Arg94

<400> 58

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu  
1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr  
20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val  
35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe  
50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val  
Val  
65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Cys Arg  
Ser  
85 90 95

Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp  
Asp  
100 105 110

Pro Arg Phe Gln Asp Ser Ser Ser Lys Ala Pro Pro Pro Ser  
Leu  
115 120 125

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu  
Pro Gln  
130 135 140

<210> 59  
 <211> 145  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> hCG beta-subunit with Cys substituted for Arg95

<400> 59

Ser	Lys	Glu	Pro	Leu	Arg	Pro	Arg	Cys	Arg	Pro	Ile	Asn	Ala	Thr
Leu														
1														15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
 Thr

Ala	Val	Glu	Lys	Glu	Gly	Cys	Pro	Val	Cys	Ile	Thr	Val	Asn	Thr
										20	25		30	

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
 Val

Ile	Cys	Ala	Gly	Tyr	Cys	Pro	Thr	Met	Thr	Arg	Val	Leu	Gln	Gly
										35	40		45	

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
 Phe

Leu	Pro	Ala	Leu	Pro	Gln	Val	Val	Cys	Asn	Tyr	Arg	Asp	Val	Arg
										50	55		60	

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val  
 Val

Glu	Ser	Ile	Arg	Leu	Pro	Gly	Cys	Pro	Arg	Gly	Val	Pro	Asn	Val
										65	70		75	

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Cys  
 Ser

Ser	Tyr	Ala	Val	Ala	Leu	Ser	Cys	Gln	Cys	Ala	Leu	Cys	Arg	Cys
										85	90		95	

Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp  
 Asp

Thr	Thr	Asp	Cys	Gly	Gly	Pro	Lys	Asp	His	Pro	Leu	Thr	Cys	Asp
										100	105		110	

Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser  
 Leu

Pro	Arg	Phe	Gln	Asp	Ser	Ser	Ser	Ser	Lys	Ala	Pro	Pro	Pro	Ser
										115	120		125	

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu  
 Pro Gln

Pro	Ser	Pro	Ser	Arg	Leu	Pro	Gly	Pro	Ser	Asp	Thr	Pro	Ile	Leu
										130	135		140	

<210> 60  
<211> 145  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG beta-subunit with Cys substituted for Ser96

<400> 60

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu  
1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr  
20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val  
35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe  
50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val  
Val  
65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg  
Cys  
85 90 95

Thr Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp  
Asp  
100 105 110

Pro Arg Phe Gln Asp Ser Ser Ser Lys Ala Pro Pro Pro Ser  
Leu  
115 120 125

Pro	Ser	Pro	Ser	Arg	Leu	Pro	Gly	Pro	Ser	Asp	Thr	Pro	Ile	Leu
Pro	Gln													
130														140
<210> 61														
<211> 145														
<212> PRT														
<213> Artificial Sequence														
<220>														
<223> hCG beta-subunit with Cys substituted for Thr97														
<400> 61														
Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr														
Leu														
1		5												15
Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr														
Thr														
20							25							30
Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly														
Val														
35						40								45
Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg														
Phe														
50					55									60
Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val														
Val														
65				70										75
80														
Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg														
Ser														
85							90							95
Cys Thr Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp														
Asp														
100						105								110
Pro Arg Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser														
Leu														
115							120							125

Pro	Ser	Pro	Ser	Arg	Leu	Pro	Gly	Pro	Ser	Asp	Thr	Pro	Ile	Leu
Pro	Gln													
130								135						140
<210> 62														
<211> 145														
<212> PRT														
<213> Artificial Sequence														
<220>														
<223> hCG beta-subunit with Cys substituted for Thr98														
<400> 62														
Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr														
Leu														
1				5					10					15
Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr														
Thr														
20					25						30			
Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly														
Val														
35					40						45			
Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg														
Phe														
50					55						60			
Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val														
Val														
65				70							75			
80														
Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg														
Ser														
85						90						95		
Thr Cys Asp Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp														
Asp														
100						105						110		
Pro Arg Phe Gln Asp Ser Ser Ser Lys Ala Pro Pro Pro Ser														
Leu														
115						120						125		

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu  
Pro Gln  
130 135 140

<210> 63  
<211> 145  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> hCG beta-subunit with Cys substituted for Asp99  
<400> 63

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu  
1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr  
20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val  
35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe  
50 55 60

Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val  
Val  
65 70 75  
80

Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg  
Ser  
85 90 95

Thr Thr Cys Cys Gly Gly Pro Lys Asp His Pro Leu Thr Cys Asp  
Asp  
100 105 110

Pro Arg Phe Gln Asp Ser Ser Ser Lys Ala Pro Pro Pro Ser  
Leu

115

120

125

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu  
Pro Gln

130

135

140

<210> 64

<211> 95

<212> PRT

<213> Artifical Sequence

<220>

<223> An hCG alpha-subunit analog with Gly-Gly-Cys at its  
carboxyterminus

<400> 64

Ala Pro Asp Val Gln Asp Cys Pro Glu Cys Thr Leu Gln Glu Asn  
Pro

1

5

10

15

Phe Phe Ser Gln Pro Gly Ala Pro Ile Leu Gln Cys Met Gly Cys  
Cys

20

25

30

Phe Ser Arg Ala Tyr Pro Thr Pro Leu Arg Ser Lys Lys Thr Met  
Leu

35

40

45

Val Gln Lys Asn Val Thr Ser Glu Ser Thr Cys Cys Val Ala Lys  
Ser

50

55

60

Tyr Asn Arg Val Thr Val Met Gly Gly Phe Lys Val Glu Asn His  
Thr

65

70

75

80

Ala Cys His Cys Ser Thr Cys Tyr Tyr His Lys Ser Gly Gly Cys  
86 90 95

<210> 65

<211> 92

<212> PRT

<213> Artifical Sequence

<220>

<223> An hCG alpha-subunit analog with Asp in place of  
Asn52 and Cys in place of Ser92

<400> 65

```
<210> 66
<211> 145
<212> PRT
<213> Artificial Sequence

<220>
<223> hCG beta-subunit with Cys substituted for Ser96 and
hFSH beta-subunit residues 95-108 for hCG beta-subunit
residues 101-108

<400> 66
```

Ser Lys Glu Pro Leu Arg Pro Arg Cys Arg Pro Ile Asn Ala Thr  
Leu  
1 5 10 15

Ala Val Glu Lys Glu Gly Cys Pro Val Cys Ile Thr Val Asn Thr  
Thr  
20 25 30

Ile Cys Ala Gly Tyr Cys Pro Thr Met Thr Arg Val Leu Gln Gly  
Val 35 40 45

Leu Pro Ala Leu Pro Gln Val Val Cys Asn Tyr Arg Asp Val Arg  
Phe

50	55	60
Glu Ser Ile Arg Leu Pro Gly Cys Pro Arg Gly Val Pro Asn Val		
Val		
65	70	75
80		
Ser Tyr Ala Val Ala Leu Ser Cys Gln Cys Ala Leu Cys Arg Arg		
Cys		
85	90	95
Thr Thr Asp Cys Thr Val Arg Gly Leu Gly Pro Ser Tyr Cys Ser		
Phe		
100	105	110
Gly Glu Phe Gln Asp Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser		
Leu		
115	120	125
Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu		
Pro Gln		
130	135	140